

## 基于 EHW 和双机热备技术的故障自修复电路系统设计

张峻宾<sup>1</sup>, 蔡金燕<sup>1</sup>, 孟亚峰<sup>1</sup>, 许杰<sup>2</sup>, 孙也尊<sup>3</sup>

(1 军械工程学院 电子与光学工程系, 河北 石家庄 050003; 2 驻 783 厂军事代表室, 四川 绵阳 621000;

3 驻 247 厂军事代表室, 山西 太原 030000)

**摘要:** 在充分利用 EHW 技术的自组织、自适应及自修复优点的基础之上, 权衡传统冗余容错技术的可靠性和硬件资源消耗等指标, 提出了 EHW 与双机热备技术相结合的故障自修复电路系统. 对电路系统的模型进行了设计, 对故障自修复流程进行了深入分析. 基于 EHW 和双机热备技术的故障自修复电路系统具有重要的工程应用价值.

**关键词:** 硬件演化; 冗余容错; 双机热备技术; 故障自修复; 电路设计

## Design of the Fault Self-repair Circuit System Based on

## Evolvable Hardware and Dual Hot-backup Technique

ZHANG Jun-bin<sup>1</sup>, CAI Jin-yan<sup>1</sup>, MENG Ya-feng<sup>1</sup>, XU Jie<sup>2</sup>, SUN Ye-zun<sup>3</sup>

(1 Department of Electronic and Optical Engineering, Ordnance Engineering College, Shijiazhuang 050003, China; 2 Military Representative Office of 783, Mianyang 621000, China;

3 Military Representative Office of 247, Taiyuan 030000, China)

**Abstract:** In this paper, the circuit system design based on Evolvable Hardware (EHW) and dual hot-backup technique was proposed. It made full use of the advantages of EHW. Both the reliability of traditional redundant fault-tolerant and hardware resource consumption was considered. The universal circuit model based on EHW and dual hot-backup technique was designed. The flow of fault self-repair was analyzed in detail. The fault self-repair circuit system design can be guided by it. It will have important engineering application value.

**Key words:** evolvable hardware (EHW); redundant fault-tolerant; dual Hot-backup technique; fault self-repair; circuit design

**作者简介:**

张峻宾 男, (1987-), 博士研究生. 研究方向为电子电路故障自修复与硬件演化技术. E-mail: zjbscc@qq.com.

蔡金燕 女, (1961-), 教授, 博士生导师. 研究方向为检测理论、故障诊断、可靠性共性技术.

孟亚峰(通讯作者) 男, (1970-), 副教授、硕士生导师. 研究方向为电子装备状态检测、故障诊断.